Amendments to the Drawings

The attached drawing sheets include changes to Fig. 1 and to Fig. 25. Each replacement sheet is followed by a copy of the original sheet with changes indicated.

The replacement sheet for Fig. 1 provides corrected table entries in the illustration and corrected numbering of the display elements, as well as inclusion of the "Prior Art" legend. The replacement sheet for Fig. 25 changes the direction of the arrow between f_2 and f_3, per the examiner's comment in the Office Action.

Attachment: Replacement Drawing Sheets
Annotated Sheets Showing Changes

REMARKS/ARGUMENTS

In the pending Office Action, the Examiner objected to claims 18, 21-46, 67, 70, and 71, but indicated they would be allowable if rewritten into independent form. The indication of allowable subject matter is appreciated. With this amendment, claims 18, 21, 34, 67, 70, and 71 have been rewritten into independent form including the limitations of any intervening base claims. Therefore, claims 18, 21 through 46, 67, 70, and 71 are in condition for allowance.

The Examiner objected to the specification at page 6 and page 7, specifically with respect to mathematical expressions for cyclic parameter "b" from Figure 1. The Examiner also objected to Figure 1 for lacking a "Prior Art" legend. In the attached drawing changes, Figure 1 has been changed and the information is now correct. The labels on the depicted 7-segment display have been corrected, the entries in the accompanying table of outputs have been changed accordingly, and Figure 1 has been labeled as "Prior Art". The information in Figure 1 now conforms to the equations listed in the specification at page 6 and page 7. The Examiner also objected to Figure 25 for the direction of the arrow between f_2 and f_3, and requested correction. The attached drawing changes also include the correction to Figure 25.

The Examiner also objected to many of the claims for wording, such as changing "A" to --The--. The claims have been carefully checked and have been amended in accordance with the Examiner's observations as to wording. It is submitted that the claims meet the requirements of Section 112.

Thus, per the Examiner's comments in the Office Action, claims 18, 21 through 46, 67, 70, and 71 as amended are in condition for allowance. The substantive rejection of claims 1-17, 19, 20, 47-66, 68, 69 under Section 102 and Section 103 will be discussed next. Further examination and reconsideration of the application are requested.

Rejection Under 35 U.S.C. § 102

The Examiner rejected claims 1-13, 15-17, 19, 20, 47-62, 64-66, 68, and 69 as being anticipated by the document "Constructive Analysis of Cyclic Circuits" by Shiple et al. ("Shiple"). The Examiner asserted that Shiple shows building (synthesizing) cyclic

combinational circuits in accordance with parameters x and y. Shiple, however, relates only to *analysis* of cyclic combinational circuits and is not involved in *synthesizing* (producing) such circuits. In fact, Shiple's analysis procedure takes a cyclic circuit and produces an equivalent circuit having no cycles. In the Abstract of the Shiple document is the explanation that "We provide a symbolic algorithm that detects if a sequential circuit with combination loops exhibits standard synchronous behavior, and if so, produces an equivalent circuit without combinational loops." Thus, Shiple does not relate to synthesizing cyclic combinational circuits in accordance with parameters, rather, Shiple relates to detecting cyclic combinational circuits and replacing them with equivalent non-cyclic (acyclic) circuits.

Shiple is specifically mentioned in the specification of the application, in the paragraph bridging page 12 and page 13. In a general discussion beginning at page 11, line 3 of the application, it is noted that combinational circuits synthesized with high-level design tools can produce cycles or loops. Although cyclic circuits can have cost advantages (see page 8, lines 3-5), cycles can cause problems in the subsequent design process (page 11, lines 13-15). For example, cycles may arise in circuits synthesized with the "Esterel" design language, so creation of cycles is generally disallowed in such design processes (page 11, lines 19-20). Shiple analyzes circuits, detects if cycles are present, and if so, generates an acyclic (i.e., *non*-cyclic) implementation of such circuits. That is, for Shiple, a cyclic combinational circuit is to be avoided and, if detected, is to be replaced.

The pending independent claims that were rejected as anticipated by Shiple have been amended and now refer to *synthesizing* a *cyclic* combinational circuit. For example, claim 1 now recites:

> 1. A method of producing a cyclic combinational circuit, the method comprising:
>
> determining cyclic parameters; and
>
> synthesizing the cyclic combinational circuit in accordance with the determined cyclic parameters.

In a similar way, claim 47 and 50 have been amended and now recite:

47. A method of logic synthesis, the method comprising:
determining cyclic parameters; and
using the cyclic parameters during synthesis of a cyclic combinational circuit.

50. A logic synthesizer comprising:
a logic for determining a set of cyclic parameters; and
a processor configured to synthesize a cyclic combinational circuit in accordance with the determined set of cyclic parameters.

It is submitted that Shiple does not describe *synthesizing a cyclic combinational circuit* in accordance with *cyclic parameters*. Therefore, Shiple cannot synthesize cyclic combinational circuits such as recited in the claims, and therefore Shiple cannot anticipate the claimed invention. Claims 1-13, 15-17, 19, 20, 47-62, 64-66, 68, and 69 are therefore not anticipated by Shiple.

Rejection Under 35 U.S.C. § 103

The Examiner rejected claims 14 and 63 as being obvious over Shiple in view of U.S. Patent No. 5,515,292 to Roy. The Examiner asserted that Shiple teaches all of the claim elements in claims 14 and 63, but for determining the area representing cost by a literal count, and asserted that Roy shows that reducing literal count will reduce area, which will minimize the cost of manufacturing. Roy, however, does not make up for the deficiencies of Shiple in not meeting the claim language of the independent claims. The proposed combination still would have nothing to do with synthesizing cyclic combinational circuits. Therefore, the proposed combination of Shiple and Roy would not provide the claim elements of claims 14 and 63, and therefore the proposed combination does not render claims 14 and 63 obvious.

CONCLUSION

In view of the foregoing, Applicants believe that all claims now pending in this Application (claims 1-71) are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 858-350-6100.

Applicants respectfully request that the Commissioner change the Attorney Docket No. in the USPTO PAIR System and any communications connected to this matter from "18021-6226" to "020859-009010US."

The Commissioner is hereby authorized to charge the $55.00 one month extension fee for a small entity to Deposit Account No. 20-1430.

The Commissioner is hereby authorized to charge any fees associated with this communication or credit any overpayment to Deposit Account No. 20-1430.

Respectfully submitted,

David A. Hall
Reg. No. 32,233

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 858-350-6100
Fax: 415-576-0300
Attachments
DAH:dah

60794749 v1

Attachments

Inputs				Outputs (corresponding to segments)							
x_3	x_2	x_1	x_0	*a*	*b*	*c*	*d*	*e*	*f*	*g*	display
0	0	0	0	1	1	1	~~1~~ 0	1	1	~~0~~ 1	0
0	0	0	1	0	~~1~~ 0	~~1~~ 0	0	0	~~0~~ 1	~~0~~ 1	1
0	0	1	0	~~1~~ 0	1	~~0~~ 1	1	1	~~0~~ 1	~~1~~ 0	2
0	0	1	1	~~1~~	~~1~~	1	1	~~0~~	~~0~~	1	3
0	1	0	0	~~0~~	~~1~~	~~1~~	~~0~~	0	1	1	4
0	1	0	1	1	0	1	1	~~0~~	~~1~~	1	5
0	1	1	0	~~0~~	~~0~~	1	1	1	~~1~~	1	6
0	1	1	1	~~1~~	~~1~~	1	0	0	~~0~~	~~0~~	7
1	0	0	0	1	1	1	1	1	1	1	8
1	0	0	1	1	~~1~~	1	~~0~~	0	1	1	9

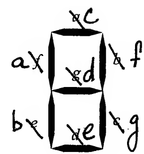


FIGURE 1

$$f_1 = \bar{x}_3 \bar{f}_2 + \bar{x}_2 x_3$$

$$f_2 = \bar{x}_1 \bar{x}_2 \bar{x}_3 + \bar{x}_1 \bar{f}_3$$

$$f_3 = \bar{x}_1 f_1 + \bar{x}_2 x_3$$

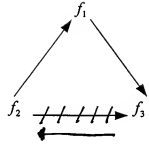
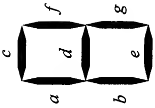


Figure 25



Inputs				Outputs (corresponding to segments)							
x_3	x_2	x_1	x_0	*a*	*b*	*c*	*d*	*e*	*f*	*g*	display
0	0	0	0	1	1	1	0	1	1	1	0
0	0	0	1	0	0	0	0	0	1	1	1
0	0	1	0	0	1	1	1	1	1	0	2
0	0	1	1	0	0	1	1	1	1	1	3
0	1	0	0	1	0	0	1	0	1	1	4
0	1	0	1	1	0	1	1	1	0	1	5
0	1	1	0	0	1	1	1	1	0	1	6
0	1	1	1	0	0	1	0	0	1	1	7
1	0	0	0	1	1	1	1	1	1	1	8
1	0	0	1	1	0	1	1	0	1	1	9

FIGURE 1

(PRIOR ART)

$$f_1 = \bar{x}_3 \bar{f}_2 + \bar{x}_2 x_3$$

$$f_2 = \bar{x}_1 \bar{x}_2 \bar{x}_3 + \bar{x}_1 \bar{f}_3$$

$$f_3 = \bar{x}_1 f_1 + \bar{x}_2 x_3$$

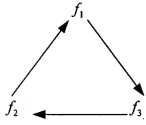


Figure 25